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**ABSTRACT**

This invention is directed to nucleic acids which encode the proteins that direct the synthesis of the orthosomycin everninomicin and to use of the nucleic acids and proteins to produce compounds exhibiting antibiotic activity based on the everninomicin structure. The DNA sequence for the gene clusters responsible for encoding everninomicin biosynthetic genes, which provide the machinery for producing everninomicin, are provided. Thus, this invention provides the nucleic acid sequences needed to synthesize novel everninomicin-related compounds based on everninomicin, arising from modifications of the DNA sequence designed to change glycosyl and modified orsellinic acid groups contained in everninomicin.

10 A *Micromonospora* site-specific integrase gene is also provided, which can be incorporated in a vector for integration into any actinomycete, and, particularly into *Monospora*. Thus, the invention further provides methods for introducing heterologous genes into an actinomycete chromosome using this particular vector.

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